US Army Corps
of Engineers ®
Portland District

September 2003 Progress Report: Fern Ridge Embankment

EXECUTIVE SUMMARY

Significant distress has been observed at the Fern Ridge Embankment since August, 2002. The distress includes depressions on the downstream slope of the embankment, deterioration of the 60-year-old drainage system, increases in flow rates from the drainage system during heavy rain events, and seepage emerging from the downstream slope of the embankment during the rainy season. The observed distress has led to two primary concerns: 1) internal erosion (embankment and/or foundation) into the failing drainage system and 2) downstream slope instability due to high water levels in the embankment.

Investigations have been/will be performed and instruments have been/will be installed to gather information necessary to understand the causes of the observed distress, operate the dam safely, and design repair alternatives.

An interim plan has been developed to operate the project safely until it can be repaired. The interim plan involves a conditional operating plan for the reservoir elevation based on piezometric water levels in the embankment, which will be monitored using thirty-eight automated piezometers. The conditional operating plan may be altered in the future if further investigations indicate more favorable conditions, or if interim measures are constructed to improve downstream slope stability. The interim plan also involves an event alert system to prevent the initiation/progression of internal erosion into the failing drainage system.

A future letter report will include a seepage analysis, stability analysis, and discussion on the causes of the distress.

FERN RIDGE DAM
PERTINENT DATA

GENERAL	
Drainage area, square miles	275
Pool elevations, feet	
Minimum flood control pool	353.0
Maximum conservation pool	373.5
Maximum full pool	375.1
RESERVOIR	
Total storage, maximum full pool, acre-feet	111,400
Total storage, maximum conservation pool, acre-feet	97,300
Minimum flood control pool, acre-feet	2,800
DAM	
Type: Earthfill with concrete gravity non-overflow section and concrete gated spillway	
Total crest length, feet	6,610
Dike No. 1 crest length, feet	915
Dike No. 2 crest length, feet	4,145
Crest elevation, feet	382
Crest width, feet	20
Maximum height, feet	44
Freeboard (above maximum full pool), feet	7
SPILLWAY	
Type: Concrete gravity, gate controlled	
Total length, feet	248
Net length, feet	204
Gates	6, tainter
Size of gates, feet	34 by 17.7
Weir crest elevation, feet	358.5
Top of gates, elevation, feet	375.5
Capacity at maximum conservation pool, El. 373.5 ft, ft^3/s	41,400
Capacity at maximum full pool, El. 375.1 ft, ft^3/s	47,200

OUTLET WORKS

Type: Sliding gate	
Type gates	4 sliding gates and 1 sluice gate
Gate size	
Outlet gates, feet	6.75 by 9.67
Sluice gate, feet	3 by 3
Invert elevations, feet	
Outlet gates	339.0
Sluice gate	341.5
Discharge capacity, ft^3/s	
Outlet gates: Minimum flood control pool, El. 353	4,560
Outlet gates: Maximum conservation pool, El. 373.5	8,260
Outlet gates: Maximum full pool, El. 375.1	8,440
Sluice gate: Minimum flood control pool, El. 353	136
Sluice gate: Maximum conservation pool, El. 373.5	254
Sluice gate: Maximum full pool, El. 375.1	261

COYOTE CREEK DIVERSION SYSTEM

Two 10-inch gated intake openings at outlet structure	
One 10-inch diameter steel pipe	
Capacity at minimum flood control pool, ft^3/s	3
Capacity at maximum conservation pool, ft^3/s	8.4

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FIGURES

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